

AMENDMENTS TO THE CLAIMS

1. (previously presented) A pointing apparatus for correct positioning of distal locking screws of an intramedullary nail comprising a hole, the pointing apparatus comprising:

means for receiving one or more images of a portion of the nail to be fixed with the screws, the one or more images showing the hole;

means for processing the one or more images to obtain coordinates of the centre of the hole and inclination of an axis of the hole; and

means for positioning an instrument in correspondence with the axis, and align the instrument with the axis.

2. (currently amended) The pointing apparatus as claimed in claim 1, further comprising:

a head which includes a reference to be viewed by an external viewing apparatus, and means for guiding a surgical instrument;

means for moving said head close to an end of the nail containing the hole, to allow said external viewing apparatus to take an image of the end of the nail containing the hole and of the reference;

means for reading the image and calculate position and inclination of the axis based on shape and dimensions of the hole shown in the image;

means for reading the image and calculate relative position and inclination of the reference, and consequently of the head, based on shape and dimensions of the reference;

means for calculating position and inclination of the axis of the hole relative to the reference and to move the head to provide the means for guiding the surgical instrument with an inclination same as the inclination of the axis of the hole.

3. (previously presented) The pointing apparatus as claimed in claim 1, further comprising:

a reference system to be viewed by an external of apparatus;

a pointing system which contains a housing;

a terminal, fitted with surgical instrument guidance means, the terminal designed to receive the pointing system via a quick release coupling associated with the housing;

means for moving the terminal close to an end of the nail containing the hole, to allow said external apparatus to take an image of the end of the nail containing the hole and of a reference integral with the terminal;

means for reading the image and calculate position and inclination of the axis based on shape and dimensions of the hole shown in the image;

means for reading the image and calculate relative position and inclination of the reference, and consequently of the terminal, based on shape and dimensions of the reference; and

means for calculating position and inclination of the axis of the hole relative to at least one between the reference and the pointing system and to move the terminal to provide the surgical instrument guidance means with an inclination same as the inclination of the axis of the hole.

4. (previously presented) The pointing apparatus as claimed in claim 2, wherein the means for reading comprise a sensor connected via an interface to an output of the external apparatus.

5. (previously presented) The pointing apparatus as claimed in claim 2, wherein the reference is integral with the head and comprises one or more radiopaque bodies of known shape, dimensions and position, incorporated in the head.

6. (previously presented) The pointing apparatus as claimed in claim 3, wherein the reference system is separate from the terminal and the terminal is connectable to the reference system via a quick release coupling and is fitted with means for guiding a surgical instrument in a known position relative to at least one between the reference system and the pointing system.

7. (previously presented) The pointing apparatus as claimed in claim 2 wherein the

reference comprises a plurality of radiopaque elements of known shape, dimensions and position.

8. (previously presented) The pointing apparatus as claimed in claim 7 wherein the radiopaque elements are spheres.

9. (previously presented) The pointing apparatus as claimed in claim 7 wherein the radiopaque elements are located at vertices of polygons of known dimensions.

10. (previously presented) The pointing apparatus as claimed in claim 3 wherein the terminal and the reference system are mounted on a support comprising a plurality of numerically controlled actuators designed to control translation of the terminal and the reference system according to at least two linear directions orthogonal to one another, and to control rotation of the terminal and the reference system around at least two non-parallel axes.

11. (previously presented) The pointing apparatus as claimed in claim 2 further comprising a sterile hood, fitted to the head, the sterile hood designed to cover supports and any other parts coming into contact with an operating field of the pointing apparatus.

12. (withdrawn) A pointing apparatus for correct positioning of distal locking screws of an intramedullary nail, the pointing apparatus comprising :

- a support able to be positioned proximally to an operating table;

- a first moving system, mounted on the support, subject to action of numerical control means that control movement of the first moving system along a first axis;

- a second moving system, mounted on the first moving system, subject to action of numerical control means that control movement of the second moving system, along a second axis;

- a reference and/or pointing system made of radiopaque material comprising spheres arranged not to be superimposed with images taken by an external apparatus associated with the pointing apparatus, thus facilitating correct framing of the spheres and target holes in the intramedullary nail;

means provided with a quick release coupling system for fitting to the reference and/or pointing system and suitably shaped to allow fitting of a surgical instrument guide;

means designed to receive an input image file from the external apparatus wherein images of an end of the nail with a hole for the distal locking screws and the reference are taken simultaneously;

processing means to process the images of the end of the nail with the hole and of the reference and consequently calculate coordinates and inclination of an axis of the hole relative to the reference, and to automatically calculate a length of a screw;

activation means to activate actuators of the first moving system and second moving system, to align the surgical instrument guide with the hole in the nail.

13. (withdrawn) The pointing apparatus as claimed in claim 3, wherein the external apparatus is chosen from a group consisting of an X-ray apparatus and a fluoroscopic apparatus.

14. (withdrawn) The pointing apparatus as claimed in claim 3, wherein the surgical instrument guidance means comprise a cannula.

15. (withdrawn) The pointing apparatus as claimed in claim 3, wherein the means for reading comprise a sensor connected via an interface to an output of the external apparatus.

16. (withdrawn) The pointing apparatus as claimed in claim 3, wherein the means for guiding a surgical instrument comprise a cannula.

17. (withdrawn) The pointing apparatus of claim 12, wherein the external apparatus is chosen from a group consisting of an X-ray apparatus and a fluoroscopic apparatus.